TRANSPOWER

Transpower's Application of IoT

Andrew Renton Senior Principal Engineer, EEA Conference Auckland 25-27 June 2019

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Today

- What is IoT
- How to use
- Examples
- Discussion

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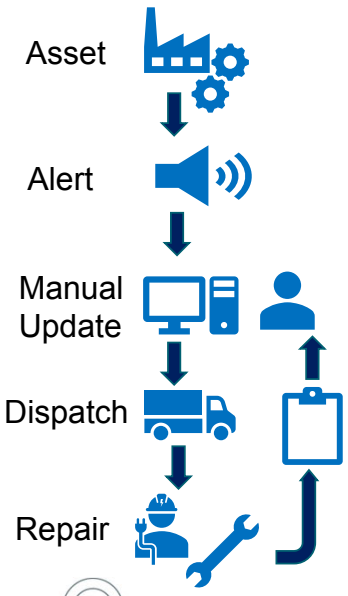

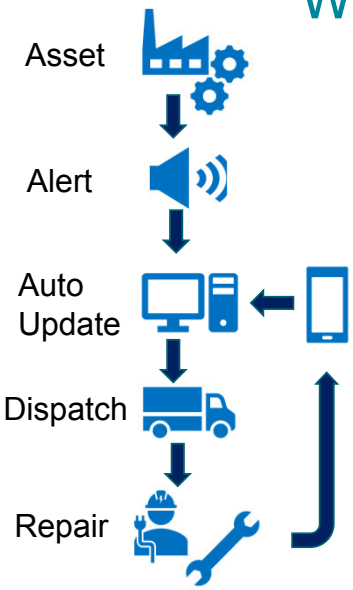

What is the IoTs

- Think very lite SCADA
- Self updating Computer

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The Why & How

- You have a need to know
- You have a need to respond
- You can sense and detect
- You can effectively automate the actions
- Very cheap sensor
- Very cheap comms backhaul
- Very small bandwidth
- Very small data packets

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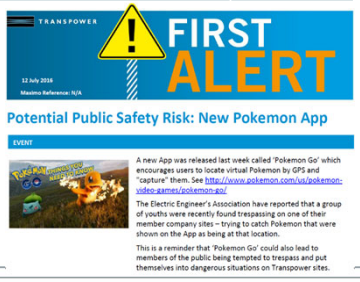
Problem: Our Towers in public areas allows the potential for trespassers to climb

Low probability – high impact event	
No of Towers in NZ	23,720
Total No Urban Towers in NZ / Towers of most interest	10,877 / 5,000
No of climbing incidents nationwide over the last 3 years	1 – 3 per year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FIRST ALERT

12 July 2016

Maximo Reference: N/A

Potential Public Safety Risk: New Pokemon App

EVENT

A new App was released last week called 'Pokemon Go' which encourages users to locate virtual Pokemon by GPS and "capture" them. See http://www.pokemon.com/us/pokemon-video-games/pokemon-go/

The Electric Engineer's Association have reported that a group of youths were recently found trespassing on one of their member company sites – trying to catch Pokemon that were shown on the App as being at that location.

This is a reminder that 'Pokemon Go' could also lead to members of the public being tempted to trespass and put themselves into dangerous situations on Transpower sites.

Recent incidents:

Pokémon GO

Public self harm

Tongan Flag

Trampoline on a Tower

We're for New Zealand. Tū mai Aotearoa.

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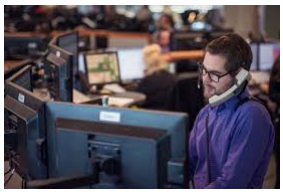
Current/Possible Solutions
(Pros & Cons)



Call to Transpower

- **Response:** Ensures climber has been seen and despatches emergency services
- **Effectiveness:** Unreliable. No 24/7 monitoring

Patrol Car

- **Response:** Ensures climber has been seen and despatches emergency services
- **Effectiveness:** Unreliable. No 24/7 monitoring

Camera/Sensor (iDefigo)

- **Response:** Ensures emergency services despatched ONLY when camera sees person
- **Monitor:** Simple to manage through iDefigo app
- **Expensive:** Subscription of $50/month for up to 700 images/month
- **Expensive:** Active monitoring service of $95 per month
- **Expensive:** Cost of hardware is $5k. Capital cost is $800 each. Two cameras per tower are needed.
- **Location:** Camera needs to be located high up in the tower with uncertain field of view

Vibration Sensor (Motiv)

- **Cheap:** On-off cost of $65 per sensor.
- **Installation:** Minimal equipment. Simple to install
- **Monitor:** Simple for TP personnel to manage through Motiv monitoring system
- **Response:** May despatch emergency services when only a false alarm

We're for New Zealand. Tū mai Aotearoa.

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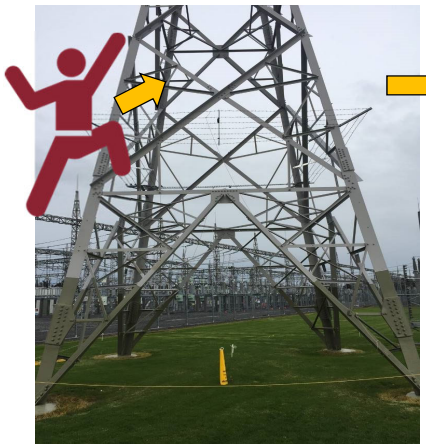
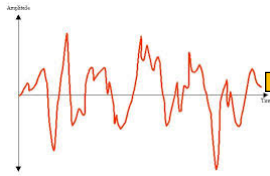
IoT Vibration Sensor How it works





Is it a bird?
Is it wind?

Yes → Ignore

No

Message Transpower Line & Tower

Check if work scheduled

Yes → Ignore

No

Dispatch patrol

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Solution Development

motiv

Test — Test rig

Proof of concept — OTA-PAK A0001 tower outside Auckland TP office

Trial ($18k TP + Motiv) — OTA-MNG line, 14 structures, 56 sensors and monitoring $8k sensor & 1 yr monitoring

Demonstration ($62k TP + Motiv) — HEN-OTA line, 92 structures, 368 sensors and monitoring $51k sensor & 1 yr monitoring

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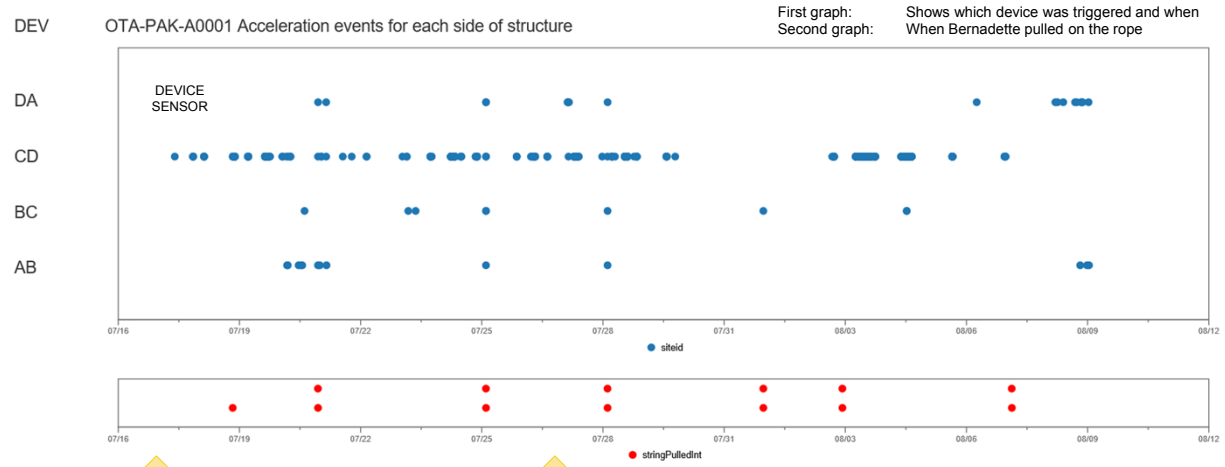
Data Results and Self Learning



Installed Devices 14th July 2017

Adjusted detection algorithm Settings were changed on 27th July 2017

The above data points highlights the ongoing algorithm learning and adjustment, reducing false triggers and improving correct identification. Actual tower climbing by service providers and more sensors will improve this sooner

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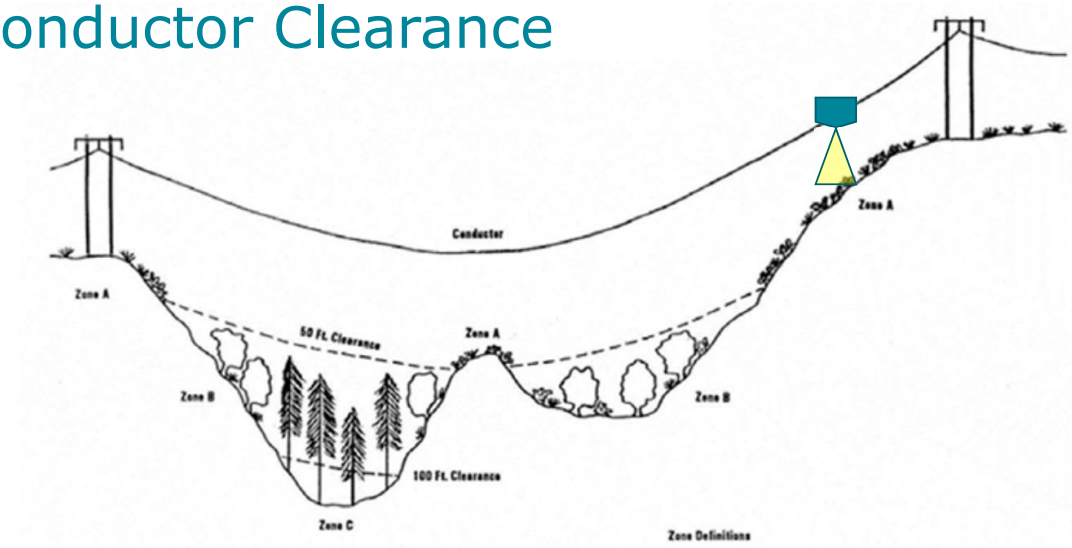
Conductor Clearance



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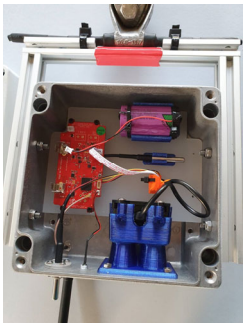

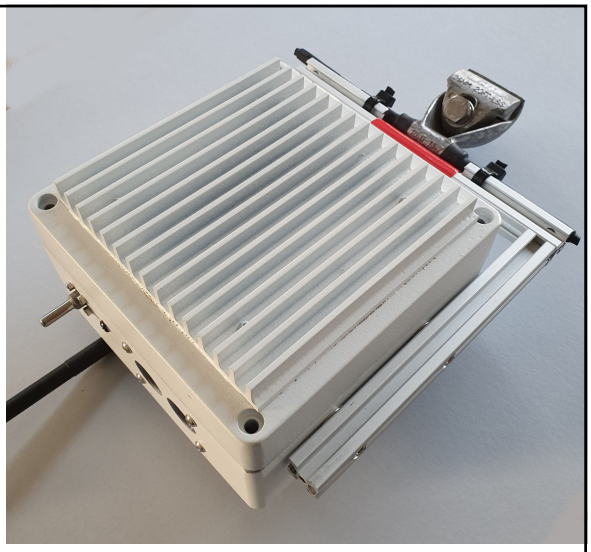

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Additional Applications

- GPS Located power equipment
- EMF Distance detector

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THANKYOU FOR YOUR ATTENTION

- Questions and discussion?
- For more information
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  - Andrew.renton@transpower.co.nz

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